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RESEARCH ARTICLE

EFFECTS OF YOGA ON GLOBAL MOTIVATION AND MEMORY IN RELATION TO PERCEIVED STRESS OF MEDICAL STUDENTS

***Sheela Joice, P. P., Maruthy, K. N. and Kannappan, R.**

Research Scholar, Vinayaka Missions University, India

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ABSTRACT

Background: Motivation is an internal driving force to create the circumstances that influence students to do work hard. Besides, memory is an ability to recall past events or previously learnt information and utilize the skills for practical purpose.
Objectives: The objectives of the present study were to assess the effects of yoga module on global motivation and memory in relation to perceived stress of medical students.
Design: Pre - post design was used to measure the effects the module. 120 female students who had 60 low stress and 60 high stress on the stress scale (PSS) and were selected and randomly assigned into experimental and control groups. The experimental group was exposed to yoga module-consisting of yoga asanas, for 12 weeks covering a total of 40 sessions. The control group was not exposed to the training for the entire period.
Materials: The global motivation scale (GMS) Frédéric Guay, Geneviève A. Mageauet Robert J. Valler and 29:8, 2003, and (PGI) memory scale by Pershad, Dwarka and N.N Wing were used to the groups at before and after assessments.

INTRODUCTION

Anxiety, stress and mental tensions have become almost inevitable companions of human life: Everyone is facing the menace of stress in one way or the other. Medical students undergo tremendous stress during various stages of the course (Supe 1998). Syllabus is vast, compared to time they got for reading, understanding and analysing subjects. Also time is required for adjustment in new environment of college. To overcome all this problems they need to have good concentration power and memory. Present study is done to observe effect of yoga on global motivation and memory. Indian students are suffering from high level of stress, anxiety, depression and frustration, which affect them and their families adversely. Deterioration of healthy value system, due to which our adolescents are failed to discriminate between "right and wrong" or "do"s and "donot"s. Daily newspapers report many of the abnormal tendencies of that can cause affecting locomotors activity and altered behavioural changes (emotions and anxiety) (Ambareesha Kondam, 2013). The mechanisms underlying improvement in cognitive tasks induced by yoga practice are not completely understood. It has been suggested that this effect arises from the improvement in mental concentration (Subramanya and Telles, 2009). It is found that hatha yoga practices like asanas, kriyas, mudras, bandhans and meditation techniques helped the subjects to develop awareness within them by improving their intellectual functions. Studies have reported higher perceived stress among students in healthcare courses as compared to students from other fields. Yoga is a philosophy & discipline applied to development of mind, body & spirit. The science of yoga is a powerful stream of knowledge, which enables the practitioners to achieve radiant physical health, serene mind, and continuous spiritual uplift and creates the ability for harmonious social living. Yoga and pranayama are ancient sciences which originated in India, which can be practised to combat stress (Brown and Gerbarg, 2009). Perceived stress has a negative impact on executive functions. The processing of sensory information at the thalamic level is facilitated during the practice of pranayama. Yoga breathing through a particular nostril increased spatial memory scores. "OM" Mediation has been shown to cause mental alertness.

The objective of current study was (i) to study the effect of yoga on global motivation of Medical students (ii) to study the effect of yoga on memory of the medical students.

MATERIALS AND METHODS

This study was conducted in the Department of Physiology, Annapoorana Medical College, Tamilnadu, India, during January 2013 to June 2013. Yoga training was shared daily for 30 minutes in the morning for 12 weeks. Study was

****Corresponding author: Sheela joice,***
Research Scholar, Vinayakamissions University, India.

commenced after obtaining approval from the institute's scientific advisory committee and human ethics committee.

Participants

We considered 120 volunteers who were in the age group of (18-22) years, who were in self-reported good health, who were undergoing various health science courses (medical, homoeopathy, physiotherapy). We excluded volunteers who had practised yoga in the past one-year and those with current or previous mental or neurological diseases. We explained the study design to the volunteers and made them aware that their participation would remain anonymous and that they had the freedom to withdraw from the study at any time. We included only those who gave their written informed consents to participate in the study. Stress was studied as an independent variable and used for the purpose of classification i.e. High Stress students and Low Stress students. Here idea was not to compare High Stress students and Low Stress students but to study whether stress and yoga have any interaction effect on global motivation and memory.

Parameters Measured

1.Height
2.Weight
3. Cohen Perceived Stress Scale
4.Global Motivation Scale
5.PGIMS Memory Scale

Study design

The participants involved in the recording of the parameters were blind to the experimental conditions. We familiarized the participants with the different test scale to produce results that were more consistent. On the day of assessment, participants reported to the Department of Physiology, Annapoorana medical college between 9 and 10 AM, at least two hours after eating a light breakfast. Then, the above-mentioned parameters were recorded. We administered these tests in the same order as given here, before and after interventions to all the participants(n=120).

Intervention

We trained the participants with the yoga technique for one week, before the start of the intervention period. Yoga intervention was carried out for about 30 minutes a day, five times per week, for a duration of 12 weeks. A certified yoga trainer gave the yoga training and intervention. Participants practised the yoga in a quiet room which was maintained at a comfortable temperature (25 ± 2ºC). Typical sessions of yoga were as follows:

1.Suryanamaskar-4 minutes
2.Padmasana-4 minutes
3.Paschimottanasana-4 minutes
4.Padahastasana-4minutes
5.Sarvangasana-2minutes
6.Bhujangasana-3minutes
7.Vajrasana-2 minutes
8.Tree stand pose-1 minutes
9.super brain yoga- 1 minutes
10.Savasana-5minutes

Statistical analysis

To study the effect of yoga on perceived stress, global motivation and memory, data was analysed separately using `t` test and F test. ANOVA was employed, to distinguish the effect of mean at two levels in pre and post test. Perceived stress is a classified variable and studied at two levelsi.e. Students with high perceived stress and students with low perceived stress. Yoga module has been taken as a treatment variable and given to the students. Datais given in Table 1-4.

Table 1. Mean and standard deviation scores of global motivation in low perceived stress(lps) and high perceived stress(hps) groups before and after yoga intervention

GLOBAL MOTIVATION		Before	After	Difference
LPS	Mean	87.18	91.62	4.44
	SD	1.41	1.63	
HPS	Mean	136.97	140.38	3.41
	SD	1.64	2.01	

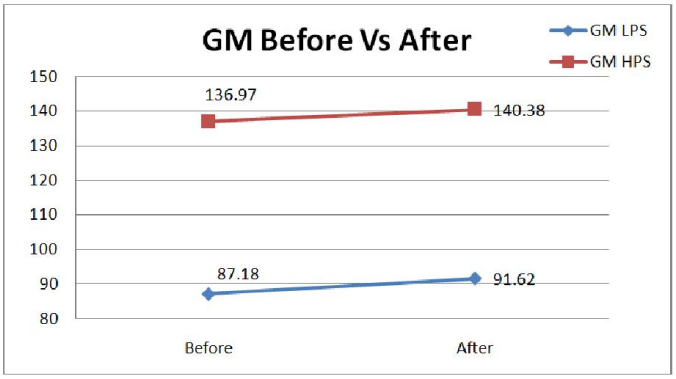

Fig.1. Difference in GM before and after yoga in low and high perceived stress group

Global Motivation among LPS students shows statistical significant improvement by yoga intervention. Using Students t test t=32.6921 with p value=1.6808E-57 ~ 0.0000 <0.0001

Similarly for HPS group, t=16.5849 p value=6.96E-24 ~0.0000<0.0001

Using Z test Z= 1,0933, p value =0.2786 >0.05 and Z=0.9504, p value=0.3457>.05 indicating that the average improvement in the score of GM is 3.5 units in LPS and HPS groups.

There is significant difference in the GM score of LPS and HPS students. Also significant difference is observed in the GM score in the pre and post score of yoga. Since p values for F test is 0 <0.0001, the difference is established.

The interaction in GM between LPS and HPS at pre and post time is significant as F=5.4670 with p value=0.0202<0.05.

Table 2. Difference in global motivation in relation to low and high perceived stress before and after yoga intervention

ANOVA						
Source	SS	df	MSS	F	Pvalue	Significance
Total	147290.7	239				
GM LPS Vs HPS	145681.5	1	145681.5	51369.64	4.2E-278~0.0000	<0.01
Before Vs After Yoga	924.3375	1	924.3375	325.9362	2.36E-46~0.0000	<0.01
Interaction	15.50417	1	15.50417	5.467017	0.020215	<0.05
Error	669.2833	236	2.835946			

Table 3. Mean and standard deviation scores of memory in low perceived stress (LPS) and high perceived stress (HPS) groups before and after yoga intervention

Memory		Before	After	Difference
LPS	Mean	54.55	60.98	6.43
	SD	2.85	1.93	
HPS	Mean	64.73	69.45	4.72
	SD	2.39	2.26	

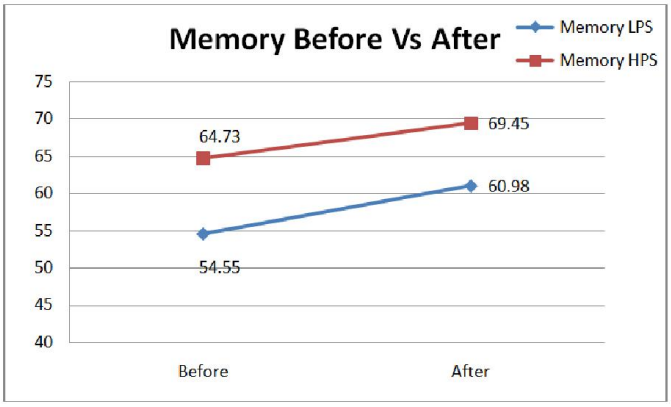

Fig. 2. Difference in MEMORY Before and After Yoga in LPS and HPS groups

Memory among LPS students shows statistical significant improvement after yoga intervention. Using Students t test t=20.7724 with p value=8.09E-29~ 0.0000 <0.0001

Similarly for HPS group, t=28.9764, p value=1.38E-36 ~0.0000<0.0001

Using Z test Z= 1, 0887, p value =0.2806 >0.05 showing an improvement in memory of 6.25 units among LPS students and Z=0.8117, p value=0.4202>0.05 indicating an average improvement in the score 4.75 units in the HPS groups

Since p values for F test is 0 <0.0001, the difference is established. The interaction in GM between LPS and HPS at pre and post time is significant as F=7.8060 with p value=0.00563<0.01.

RESULTS

The results have shown that the students, who practiced yoga module yielded higher global motivation levels and exhibited better memory.

Table 1 reveals means and standard deviation scores of global motivation in low perceived stress (LPS) and high perceived stress (HPS) groups before and after yoga intervention. The means of global motivation in yoga group in LPS (P value=1.6838E-39~ 0.0000 <0.01) is found to be greater than that of control group, also same for HPS (P value=6.96 E-24 ~0.0000 <0.01), Fig:1 reveals difference in global motivation before and after yoga in low and high perceived stress groups.

Table 2 reveals that F-ratio for the difference between means of high stress group and low stress group of global motivation was found to be significant at the 0.01 level of confidence. Thus it means that those students who were exposed to yoga exhibited better motivation then those who were not exposed to yoga.

Table 3 reveals means and standard deviation scores of memory in low perceived stress (LPS) and high perceived stress(HPS) groups before and after yoga intervention. The means of memory in yoga group in LPS (Pvalue=8.09E-29 ~0.0000 <0.01) is found to be greater than that of control group, also same for HPS (P value=1.37 E-36~0.0000 <0.01), Fig:2 reveals difference in memory before and after yoga in LPS and HPS groups.

Table 4. Difference in memory in relation to low and high perceived stress before and after yoga intervention

ANOVA						
Source	SS	df	MSS	F	Pvalue	Significance
Total	8462.796	239				
Memory LPS Vs HPS	5217.337	1	5217.337	921.3381	1.9E-83	<0.01
Before Vs After yoga	1864.838	1	1864.838	329.3147	1.16E-46	<0.01
Interaction	44.20417	1	44.20417	7.806086	0.005635	<0.01
Error	1336.417	236	5.662782			

There is significant difference in the Memory score of LPS and HPS students. Also significant difference is observed in the Memory score in the pre and post score of yoga.

Table 4 reveals that F-ratio for the difference between means of high stress group and low stress group of memory was found to be significant at the 0.01 level of confidence. Thus it means

that those students who were exposed to yoga exhibited better memory then those who were not exposed to yoga.

DISCUSSION

It is evident from the results that, the students who were exposed to yoga module exhibited enhanced global motivation and memory. The investigations made by various researches proved that yogic practice improves memory of the school children, (Kochar, 1974 Kochar and Partap, 1972), the practice of yoga emphasizes body awareness and involves focusing one's attention on breathing or specific muscles or parts of body; therefore it is possible that yoga may improve more general attention abilities. Attention focus is a major aspect of yoga practice. It produces similar effects as relaxation in that it tends to promote self-control, attention and concentration, self-efficacy, body awareness and stress reduction (Palsane and Kochar, 1973). The effects of yoga practice in the psycho physiological parameters related to stress and general emotional health could have an indirect effect on cognition. Indeed, it has been shown that stress levels interfere with memory performance (Nardo and Reynolds, 2002). The mechanisms underlying improvement in cognitive tasks induced by yoga practice are not completely understood. It has been suggested that this effect arises from the improvement in mental concentration **(**Rocha, 2012). It has been shown that stress levels interfere with memory performance Mindfulness Based Stress Reduction (MBSR) programs, which are usually 8 weeks in duration and combine mindfulness meditation and gentle yoga, have been found to improve mood and affective processes (Nyklícek and Kuijpers, 2008). In general, mind and body control techniques can have potential beneficial effects on cognition because they involve active attention exercises. For example, it has been shown that the yoga practice enhances subject's attention on breathing and specific body muscles, referring to a general improvement in attention capacity. **(**Oken and Zajdel, 2006) On the other hand, cognition improvement could be indirectly achieved by the attenuation of emotional intensity and stress reduction induced by the regular practice of Yoga.

Conclusion

The data collected among the medical students and analysed indicate that yoga can effectively improve memory and global motivation and significantly reduce perceived stress on the student's healthy life.

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